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# ● PRINTER RUSH ●
## (PTO ASSISTANCE)

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| **Application :** | 09/515,101 | **Examiner :** | Patel | **GAU :** | 2655 |
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[RUSH] **MESSAGE:** Claims 1 has Vertical Line through text Obscuring words/letters. Please Resolve.

Thank you CA

[XRUSH] **RESPONSE:** ~~See attached Action~~ Corrected

Michael ~~Brad~~ Kondoudis 1518

Thomas Jones 202-434-1500 **INITIALS:** PS

NOTE: This form will be included as part of the official USPTO record, with the Response document coded as XRUSH.

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**IN THE CLAIMS:**

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

**Please AMEND claims 1 and 38 in accordance with the following.**

1. (CURRENTLY AMENDED) A method of controlling power of a laser diode emitting laser light on a disc by using a difference between a level of the laser light reflected by the disc and a reference level, the difference being detected after the laser light level reflected by the disc is compared with the reference level, the method comprising:

generating a periodic synchronization signal; and

controlling the power of the laser diode in synchronism with the synchronization signal by:

sampling the difference between the level of the laser light and the reference level to produce a sampled differences,

calculating an average of a predetermined number of the sampled differences, after producing the sampled differences, to produce an average compared result, and

controlling the power level of the laser diode according to the average compared result.

2 - 4. (CANCELLED)

5. (ORIGINAL) The method of claim 1, wherein the disc is a digital versatile disc-read only memory (DVD-ROM), and the synchronization signal is a mirror signal indicating a mirror area of the DVD-ROM.

6. (ORIGINAL) The method of claim 1, wherein the disc is a digital versatile disc-read only memory (DVD-ROM), and the synchronization signal is a gap signal indicating a gap area of the DVD-ROM.

7. (ORIGINAL) The method of claim 1, wherein the disc is a digital versatile disc-random

access memory (DVD-RAM), and the synchronization signal is obtained by dividing a clock signal required to drive the DVD-RAM by a ratio.

8. (ORIGINAL) The method of claim 7, further comprising varying the division ratio.

9. (CANCELLED)

10. (PREVIOUSLY PRESENTED) The method of claim 1, wherein the synchronization signal is obtained by dividing a clock signal required to drive the disc by a ratio.

11. (ORIGINAL) The method of claim 10, further comprising varying the division ratio.

12. (PREVIOUSLY PRESENTED) An apparatus for controlling a power of a laser diode emitting laser light on a disc, comprising:

a photo diode which receives the laser light reflected by the disc to generate a current signal corresponding to a level of power of the reflected laser light;

a comparator which outputs an output voltage corresponding to the current signal from the photo diode compares the output voltage with a reference voltage and outputs a binary decision signal which indicates which of the output voltage and the reference voltage is higher;

an up/down counter which up/down counts the binary decision signal in accordance with the comparison result of the comparator to generate a count result;

a laser diode driver which controls a level of the power of the laser diode according to the count result of the up/down counter; and

an automatic power (APC) controller which controls an automatic power control of the laser diode, the APC controller being interposed between the up/down counter and the laser diode driver, the APC controller sampling the counted result from the up/down counter and latching an average of a predetermined number of the sampled counted results in synchronism with a periodic synchronization signal, and outputting the latch result to the laser diode driver.

13. (ORIGINAL) The apparatus of claim 12, wherein the synchronization signal has a predetermined enable interval, and the APC controller latches the counted result from the up/down counter at an end of the enable interval.

14. (PREVIOUSLY PRESENTED) The apparatus of claim 13, wherein the APC

controller samples the counted result from the up/down counter during the enable interval.

15. (ORIGINAL) The apparatus of claim 12, wherein the disc is a digital versatile disc-read only memory (DVD-ROM), and the synchronization signal is a mirror signal indicating a mirror area of the DVD-ROM.

16. (ORIGINAL) The apparatus of claim 12, wherein the disc is a digital versatile disc-read only memory (DVD-ROM), and the synchronization signal is a gap signal indicating a gap area of the DVD-ROM.

17. (ORIGINAL) The apparatus of claim 12, wherein the disc is a digital versatile disc-random access memory (DVD-RAM), the apparatus further comprising a divider which divides a clock signal required to drive the DVD-RAM by a ratio to generate the synchronization signal.

18. (ORIGINAL) The apparatus of claim 17, wherein the divider varies the division ratio.

19. (ORIGINAL) The apparatus of claim 12, wherein the APC controller samples sampling control values designating the power level of the laser diode, in synchronism with the synchronization signal, and latches a predetermined number of the sampled sampling control values.

20. (ORIGINAL) The apparatus of claim 19, wherein the disc is a digital versatile disc-random access memory (DVD-RAM), the apparatus further comprising a divider which divides a clock signal required to drive the DVD-RAM by a ratio to generate the synchronization signal.

21. (ORIGINAL) The apparatus of claim 20, wherein the divider varies the division ratio.

22. (PREVIOUSLY PRESENTED) The method of claim 1, wherein the controlling the power further comprises controlling the power of the laser diode only at non-effective data areas of the disc.

23. (PREVIOUSLY PRESENTED) The method of claim 1, wherein the controlling the power further comprises generating the synchronization signal selectively in accordance with a sub automatic power control (APC) mode, an average APC mode and a sub-average APC mode

for the disc.

24. (ORIGINAL) The method of claim 1, further comprising:

adjusting the reference level based upon a read mode, a record mode and an erase mode for the disc.

25. (PREVIOUSLY PRESENTED) A method of controlling power of a laser diode emitting laser light on a disc by using a difference between a level of the laser light reflected by the disc and a reference level, the difference being detected after the laser light level reflected by the disc is compared with the reference level, the method comprising:

generating a periodic synchronization signal;

controlling the power of the laser diode in synchronism with the synchronization signal; and

adjusting the reference level based upon a read mode, a record mode and an erase mode for the disc, wherein the adjusting of the reference level comprises:

adjusting the reference level to a first value if the mode for the disc is the read mode,

adjusting the reference level to a second value if the mode for the disc is the erase mode for lands of the disc,

adjusting the reference level to a third value if the mode for the disc is the erase mode for grooves of the disc,

adjusting the reference level to a fourth value if the mode for the disc is the record mode for the lands of the disc, and

adjusting the reference level to a fifth value if the mode for the disc is the record mode for the grooves of the disc.

26. (PREVIOUSLY PRESENTED) The method of claim 1, wherein the controlling the power further comprises:

up/down counting according to the average compared result to determine a counted result;

latching the counted result in accordance with the synchronization signal, to determine a latched power signal; and

wherein the controlling the power of the laser diode in accordance with the average compared result further comprises controlling the power of the laser diode in accordance with the latched power signal.

27. (ORIGINAL) The method of claim 26, wherein the synchronization signal is a mirror or gap signal or a clock signal required to drive the disc divided by a ratio into a division signal.

28. (PREVIOUSLY PRESENTED) A method of controlling power of a laser diode emitting laser light on a disc by using a difference between a level of the laser light reflected by the disc and a reference level, the difference being detected after the laser light level reflected by the disc is compared with the reference level, the method comprising:

generating a periodic synchronization signal; and

controlling the power of the laser diode in synchronism with the synchronization signal, wherein the controlling the power comprises:

comparing a level of the power of the laser diode to the reference level;

up/down counting according to the compared result to determine a counted result; and

latching the counted result in accordance with the synchronization signal, to determine a latched power signal;

wherein:

the controlling comprises controlling the power of the laser diode in accordance with the latched power signal; and

the up/down counting comprises

up/down counting the counted result to generate a first count in a read mode for the disc,

up/down counting the counted result to generate a second count in an erase mode of lands of the disc,

up/down counting the counted result to generate a third count in the erase read mode for grooves of the disc,

up/down counting the counted result to generate a fourth count in a record mode of the lands of the disc, and

up/down counting the counted result to generate a fifth count in the record mode for the grooves of the disc, and

selectively using the first through fifth counts as the counted value for the latching of the counted result.

29. (ORIGINAL) The method of claim 28, further comprising:

multiplexing the second and third counts to generate a first multiplexed signal;

multiplexing the fourth and fifth counts to generate a second multiplexed signal; and

the latching of the counted result comprising selectively latching the first count, the first multiplexed signal and the second multiplexed signal based upon a respective one of the read, erase and record modes of the disc.

30. (ORIGINAL) The method of claim 29, wherein the latching of the counted result comprises latching the counted result in a period of a mirror or gap signal or a clock signal divided by a ratio into a division signal.

31. (ORIGINAL) The method of claim 26, wherein the latching of the counted result comprises:

sampling the counted result;

averaging a predetermined number of the sampled counted results to determine an average value; and

latching the average value in accordance with the synchronization signal, to determine the latched power signal.

32. (ORIGINAL) The method of claim 31, wherein the synchronization signal is a mirror or gap signal or a clock signal divided by a ratio into a division signal.

33. (ORIGINAL) The method of claim 26, wherein the latching of the counted result comprises:

sampling the counted result;

averaging the sampled counted results during enablement of the synchronization signal to determine an average value; and

latching the average value in accordance with the synchronization signal, to determine the latched power signal.

34. (ORIGINAL) The method of claim 33, wherein the synchronization signal is a mirror or gap signal or a clock signal divided by a ratio into a division signal.

35 – 37 (CANCELLED)

38. (CURRENTLY AMENDED) An apparatus for controlling a power of a laser diode emitting light on a disc, the apparatus comprising:

a laser driver which controls the power of the laser diode in accordance with a control signal; and

a control circuit which generates the control signal in synchronism with a periodic synchronization signal by:

sampling the difference between the level of the laser light and the reference level to produce ~~a~~ sampled differences;

calculating an average of a predetermined number of the sampled differences, after producing the sampled differences, to produce an average compared result; and

controlling the power level of the laser diode according to the average compared result.

39. (ORIGINAL) The apparatus of claim 38, wherein the control circuit comprises:

a detector which detects the light reflected from the disc, to generate a detected power level of the laser diode;

power signal circuit which generates a power signal in accordance with the detected power level; and

an automatic power controller which latches the power signal in synchronism with the synchronization signal, to generate the control signal.

40. (PREVIOUSLY PRESENTED) The apparatus of claim 39, wherein the power signal circuit comprises:

a comparator which compares the detected power level of the laser diode with a reference level; and

an up/down counter which up/down counts according to the output of the comparator to determine a counted result, wherein the counted result is input as the power signal to the automatic power controller.

41. (ORIGINAL) The apparatus of claim 40, wherein the synchronization signal is a mirror signal, a gap signal or a clock signal required to drive the disc divided by a ratio into a division signal.

42. (ORIGINAL) The apparatus of claim 40, wherein the power signal circuit further comprises:

a reference value generator which adjusts the reference level based upon a read mode,

a record mode and an erase mode for the disc.

43. (PREVIOUSLY PRESENTED) An apparatus controlling a power of a laser diode emitting light on a disc, the apparatus comprising:

a laser driver which controls the power of the laser diode in accordance with a control signal; and

a control circuit which generates the control signal in synchronism with a periodic synchronization signal, the control circuit comprising:

a detector which detects the light reflected from the disc, to generate a detected power level of the laser diode;

a power signal circuit which generates a power signal in accordance with the detected power level, the power signal circuit comprising:

a comparator which compares the detected power level of the laser diode with a reference level; and

an up/down counter which up/down counts according to the output of the comparator to determine a counted result, wherein the counted result is input as the power signal to the automatic power controller; and

a reference value generator which adjusts the reference level based upon a read mode, a record mode and an erase mode for the disc; and

an automatic power controller which latches the power signal in synchronism with the synchronization signal, to generate the control signal;

wherein, the reference value generator comprises:

a first latch which adjusts the reference level to a first value if the mode for the disc is the read mode,

a second latch which adjusts the reference level to a second value if the mode for the disc is the erase mode for lands of the disc,

a third latch which adjusts the reference level to a third value if the mode for the disc is the erase mode for grooves of the disc,

a fourth latch which adjusts the reference level to a fourth value if the mode for the disc is the record mode for the lands of the disc,

a fifth latch which adjusts the reference level to a fifth value if the mode for the disc is the record mode for the grooves of the disc; and

a multiplexer which selectively outputs the second through fifth values according to whether a current mode is the erase or record mode and whether a current track is the land or

groove; and

the comparator comprises:

a first comparator which compares the first latched value and the detected power level in the read mode, and

a second comparator which compares the second latched value and the detected power level in the erase or record mode.

44. (ORIGINAL) The apparatus of claim 43, further comprising:

a microcomputer which supplies a first initial reference value to the first latch for adjusting the reference value, a second initial reference value to the second latch for adjusting the reference value, a third initial reference value to the third latch for adjusting the reference value, a fourth initial reference value to the fourth latch for adjusting the reference value, and a fifth initial reference value to the fifth latch for adjusting the reference value.

45. (PREVIOUSLY PRESENTED) An apparatus for controlling a power of a laser diode emitting light on a disc, the apparatus comprising:

a laser driver which controls the power of the laser diode in accordance with a control signal; and

a control circuit which generates the control signal in synchronism with a periodic synchronization signal, the control circuit comprising:

a detector which detects the light reflected from the disc, to generate a detected power level of the laser diode;

a power signal circuit which generates a power signal in accordance with the detected power level, the power signal circuit comprising:

a comparator which compares the detected power level of the laser diode with a reference level; and

an up/down counter which up/down counts according to the output of the comparator to determine a counted result, wherein the counted result is input as the power signal to the automatic power controller; and

an automatic power controller which latches the power signal in synchronism with the synchronization signal, to generate the control signal;

wherein the up/down counter comprises:

a first up/down counter which up/down counts the counted result to generate a first count in a read mode for the disc,

a second up/down counter which up/down counts the counted result to generate a second count in an erase mode of lands of the disc,

a third up/down counter which up/down counts the counted result to generate a third count in the erase read mode for grooves of the disc,

a fourth up/down counter which up/down counts the counted result to generate a fourth count in a record mode of the lands of the disc, and

a fifth up/down counter which up/down counts the counted result to generate a fifth count in the record mode for the grooves of the disc; and

the automatic power controller selectively uses the first through fifth counts as the counted value for the latching of the counted result.

46. (ORIGINAL) The apparatus of claim 45, wherein the power signal circuit further comprises:

a first multiplexer which multiplexes the second and third counts to generate a first multiplexed signal; and

a second multiplexer which multiplexes the fourth and fifth counts to generate a second multiplexed signal;

wherein the automatic power controller selectively latches the first count, the first multiplexed signal and the second multiplexed signal based upon a respective one of the read, erase and record modes of the disc.

47. (ORIGINAL) The apparatus of claim 46, wherein the synchronization signal is a mirror signal, a gap signal or a clock signal to drive the disc divided by a ratio into a division signal.

48. (ORIGINAL) The apparatus of claim 40, wherein the automatic power controller latches the counted result in a period of a mirror or gap signal or a clock signal divided by a ratio into a division signal.

49. (ORIGINAL) The apparatus of claim 40, wherein the automatic power controller samples the counted result, averages a predetermined number of the sampled counted results to determine an average value, and latches the average value in accordance with the synchronization signal, to determine the control signal.

50. (ORIGINAL) The apparatus of claim 49, wherein the synchronization signal is a mirror or gap signal or a clock signal divided by a ratio into a division signal.

51. (ORIGINAL) The apparatus of claim 40, wherein the automatic power controller samples the counted result, averages the sampled counted results during enablement of the synchronization signal to determine an average value, and latches the average value in accordance with the synchronization signal, to determine the control signal.

52. (PREVIOUSLY PRESENTED) The apparatus of claim 51, wherein the synchronization signal is a mirror or gap signal or a clock signal divided by a ratio into a division signal.

53-55 (CANCELLED)

56. (PREVIOUSLY PRESENTED) An apparatus for controlling a power of a laser diode emitting light on a disc, the apparatus comprising:

a laser driver which controls the power of the laser diode in accordance with a control signal; and

a control circuit which generates the control signal in synchronism with a periodic synchronization signal, wherein the control circuit comprises:

a detector which detects the light reflected from the disc, to generate a detected power level of the laser diode,

a power signal circuit which generates a power signal in accordance with the detected power level wherein the power signal circuit comprises:

a comparator which compares the detected power level of the laser diode with a reference level, wherein the comparator comprises:

a first comparator which compares the first latched value and the detected power level in the read mode, and

a second comparator which compares the second latched value and the detected power level in the erase or record mode,

an up/down counter which up/down counts according to the output of the comparator to determine a counted result, wherein the counted result is input as the power signal to an automatic power controller, the up/down counter comprising:

a first up/down counter which up/down counts according to the output from the first

comparator to generate a first count in a read mode for the disc,

a second up/down counter which up/down counts according to the output from the second comparator to generate a second count in an erase mode of lands of the disc,

a third up/down counter which up/down counts according to the output from the second comparator to generate a third count in the erase read mode for grooves of the disc,

a fourth up/down counter which up/down counts according to the output from the second comparator to generate a fourth count in a record mode of the lands of the disc, and

a fifth fourth up/down counter which fourth up/down counts according to the output from the second comparator to generate a fifth count in the record mode for the grooves of the disc; and

a reference value generator which adjusts the reference level based upon a read mode, a record mode and an erase mode for the disc wherein, wherein the reference value generator comprises:

a first latch which adjusts the reference level to a first value if the mode for the disc is the read mode,

a second latch which adjusts the reference level to a second value if the mode for the disc is the erase mode for lands of the disc,

a third latch which adjusts the reference level to a third value if the mode for the disc is the erase mode for grooves of the disc,

a fourth latch which adjusts the reference level to a fourth value if the mode for the disc is the record mode for the lands of the disc,

a fifth latch which adjusts the reference level to a fifth value if the mode for the disc is the record mode for the grooves of the disc, and

a multiplexer which selectively outputs the second through fifth values according to whether a current mode is the erase or record mode and whether a current track is the land or groove,

an automatic power controller which latches the power signal in synchronism with the synchronization signal to generate the control signal, and

wherein the synchronization signal is a mirror signal, a gap signal or a clock signal required to drive the disc divided by a ratio into a division signal, and the automatic power controller selectively uses the first through fifth counts as the counted value for the latching of the counted result.

57. (CANCELLED)